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THE 1900 PHARMACOPŒIA IN ITS RELATIONS TO THE SPECIAL DEPARTMENTS OF MEDICINE.¹

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In introducing this subject it may be well to give a comprehensive definition of the Pharmacopœia; what it is, its purpose, and its functions. Medical dictionaries and other standard works give definitions which for practical purposes are wholly unsatisfactory. As a rule these works define a pharmacopœia as "an authorized work containing a collection of formulæ," etc. While both the Egyptian and the Assyrian monuments and books² contain evidences that supervision was exercised over drugs, the earliest work coming under the category of a pharmacopœia was the "Prayogamrita" of Vady-achin-tamani, a Sanscrit physician. The Romans attempted 42 A.D. to establish a standard, as witness the "Compositio Medica" of Scribonius Longus. The Arabs issued the "Ibdal" in 800 A.D. This gave directions as to the standard of drugs and their preparations. Under the influence of the Arabic and Greek school of medicine, the famous University of Salerno sprang into existence. In the laws regulating medical practise for Naples and Sicily Frederick II directed the apothecaries to guide themselves by the "Antidotarium" of Nicolaus, the Dean of the Medical Department of the University of Salerno. This contains about 150 preparations with description of their medicinal properties and directions for administration. The "Antidotarium" of Myrepsius was the authority in the thirteenth century. The "Antidotarium Magnum seu Dispensatorium ad Aromatorios" was published at Florence in 1498. These two Italian works practically long dominated European medicine. In 1543 Lyons, France, adopted legally and published the "Pharmacopœia Lugdensis." In Southern Germany, early in that century, the necessity for regulation of medical practise and of adulterations in drugs was recognized by the free cities. Nuremberg laid down the following regulations for the preparation of medicine:

All the Laxativa, such as Electuaria and Pillulæ, must be prepared and dispensed by the druggists in accordance with the directions in the book known as the "Luminare Majus." To avoid any error or oversight in the preparation of these Laxativa, and to insure even preparations by all druggists, these Laxativa have been carefully copied from the "Luminare Majus," by the Doctors of medicine. Each druggist will be furnished with a copy, by which he must be guided, to the exclusion of all other formulas.

¹ Read before the Chicago Academy of Medicine, February 11, 1898.

² Rice: Reference Handbook of Medical Sciences.

✓ P 14-29

The "Luminare Majus" was a collection of formulas by the Alexandrian physician de Bosco, from Greek, Roman and Arabian medical works. De Bosco added to each formula a lengthy explanation. Aside from these works, the first work corresponding to a pharmacopœia, that produced by Valerius Cordus, was published at Nuremberg in 1546. It soon passed through numerous editions and reprints. The author died in Italy before the book was printed, and it was published after his death by the High Senate of Nuremberg. The first known edition other than the Nuremberg was the Parisian in 1548. In Lyons it went through three editions in 1552, 1559, and 1599. Venice issued one edition in 1556 and one in 1563. The Antwerp edition appeared in 1560.

The book, like all medical works of the period, was printed in Latin. The names of the compounds were derived in part from the ingredients, in part from their properties, or finally from the name of the author. According to the first mentioned method of nomenclature, a plaster which contained the juices of fenugreek, linseed and marshmallow was called *Emplastrum diachylon* ("plaster with juice"). A plaster containing vinegar and saffron was called *Emplastrum oxycroceum* ("sour saffron plaster"). In the course of time these plasters underwent changes and improvement, and the substance to which the remedy owed its name was frequently omitted. The modern *Emplastr. diachylon* contains no juice, and the *Emplastr. oxycroceum* of to-day never contains vinegar and but rarely saffron. The names of many preparations, by this modification in their preparation, became problems for the philologist. The etymological obscurity of *opodeldoc*, which has become proverbial, illustrates this. Its origin may be easily traced to the old *opodeldoc* plaster of the last Nuremberg edition of the "*Dispensatorii Valerii Cordi*." This does not contain any ingredients found in modern *opodeldoc*, but its then chief component parts were *opoponax*, *bdellium*, and *aristolochus* root. The first syllable of the first word (*opo*), the second syllable of the second word (*del*), and the last syllable of the third word (*loch*), gives "*opodelloch*" as Paracelsus wrote it, which became "*opodeltoch*" and finally "*opodeldoc*." Simples are mentioned by Cordus only when special manipulation is required to render them serviceable as remedies.

The most important part of this book is a collection of receipts by Greek, Roman and Arabian physicians, by Dioscorides of Sicily, Galenus of Pergamus, Andromachus (the body physician of Nero), Rhazes of Bagdad ("the Arabian Galen"), Avicenna (Scheich el Reis or prince of physicians), Mesue the younger, and Nicolaus

Præpositus of Salerno. The formulary contained chiefly substances derived from the vegetable and animal kingdoms. The compounds were of a class known as galenical preparations, from the Roman physician Claudius Galenus, who greatly believed in complex compounds.

As the dispensatory of Cordus was based entirely upon the Galenico-Arabian school, the five essences, tinctures, extracts, and chemicals were wanting. Distillation was only tersely referred to in connection with some ethereal oil. The custom of substitution advocated by Galen became so general during the Middle Ages that substitutes were designated. In the Paris edition the following substitutes were given: For winter cherry take common nightshade, for colocynth take castor bean, for laurel oil take tar, for ginger take pellitory root. As the substitutes did not always possess the same properties, the custom had bad results.

The larger German cities introduced pharmacopœias of their own in the sixteenth century. Augsburg had one in 1564; Cologne issued one in 1565; Basel issued one in 1561; Mantua, Italy, issued one in 1559; and Bergamo one in 1580. Salamanca issued one in 1588, which was subsequently reissued in 1601.

The first English pharmacopœia, the Pharmacopœia Londinensis, was published in 1618. This appeared in subsequent editions during the revival of science under the British Commonwealth in 1658, 1677, 1721, and 1746. The early British pharmacopœias were sensible modifications of the works of Mesue, Nicolaus Cordus, and other authors of that class. The Lyons pharmacopœia long remained supreme in France. The first Paris pharmacopœia appeared in 1637. Burdigal published a pharmacopœia in 1643, Toulon in 1648, and Valenciennes in 1651.

In the Netherlands, Amsterdam issued a pharmacopœia in 1636, Leyden in 1638, Brussels in 1639, Lille in 1640, Gand and The Hague in 1652, Utrecht and Louvaine in 1656, and Antwerp in 1681.

The first Danish pharmacopœia was published in 1658; the first Swedish pharmacopœia appeared in 1686; the first Swiss was published in 1677. The first Prussian appeared in 1698. The Austrian pharmacopœia appeared in 1739 and was revised by Storck in 1774. The first Bohemian pharmacopœia was published at Prague in 1739. Persia issued the "Makzan el Adwyn," its first pharmacopœia, in 1771. The first American pharmacopœia appeared at Philadelphia in 1778 in consequence of the attempts of Dr. Tilton of Delaware to reform the commissary department of

Washington's army. The first Irish pharmacopœia appeared in 1794. Through the influence of Dr. Josiah Bartlett, one of the medical signers of the Declaration of Independence, the Massachusetts Medical Society took the initiative in inaugurating a pharmacopœia for the United States by issuing its own pharmacopœia in 1808. This Massachusetts pharmacopœia in its *materia medica* included a large number of therapeutic agents now used by all schools, but for a long time credited to the homeopaths and eclectics. In 1815 a New York Pharmacopœia was issued under the editorial supervision of Drs. Samuel L. Mitchill and Valentine Seaman. In consequence of the success of this pharmacopœia Dr. Lyman Spalding, of New York City, submitted to the Medical Society of the County of New York a project for the formation of a National Pharmacopœia. This project finally eventuated in the present system of revision of the United States Pharmacopœia.

The first half of the present century saw these local pharmacopœias superseded by works of national authority, until now, at the close of the nineteenth century, no country can maintain scientific position as a nation without a pharmacopœia. The latest, but by no means the least creditable, is that of Japan. The most important republics of Central and South America have their own pharmacopœias. In some, foreign pharmacopœias are employed, chiefly the French Codex and German Pharmacopœia. The Republic of Costa Rica adopted officially in 1897, through La Facultad de Medicina y Cirugia at San Jose, the United States Pharmacopœia as the standard authority. In Canada and the British provinces the United States Pharmacopœia is more used than the British Pharmacopœia. The project of an Imperial pharmacopœia for the British Empire meets with but little favor and its realization is doubtful. Attempts have been made toward the formulation of an International Pharmacopœia and also a Pan-American one. The former question will be considered by the International Pharmaceutic Congress, which is to meet in Paris in 1900. The first United States Pharmacopœia was issued in 1820, and each subsequent decade has seen a revision. The one now officially designated as the seventh decennial revision was adopted January 1, 1894.

The earlier editions and revisions were the work chiefly of such medical scientists as Samuel L. Mitchill of New York, Erastus Torrey of Vermont, William Tully of Connecticut, Nathan Smith of Connecticut, Valentine Mott of New York, Samuel P. Griffith, Joseph Parrish, George B. Wood and Franklin Bache, of Philadelphia. The committee was increased to twenty-five members in 1880, comprising botanists, chemists, pharmacists and physicians in

nearly equal numbers. To these were added one representative from each of the medical departments of the Federal Government, the Army, Navy, and Marine Hospitals Service. The national committee on revision is elected by a convention constituted of delegates from incorporated medical and pharmaceutic societies and colleges, which meets in the city of Washington, D. C., decennially. This convention adopts rules and principles for the instruction and guidance of the Committee on Revision. The next convention will assemble in Washington in May, 1900.

From this brief *résumé* of the history of pharmacopœias it will be observed that a pharmacopœia is essential to every civilized country, and that the work of revision is one of great interest and importance.

Although the United States Pharmacopœia has never been legalized through national enactments of the various States pertaining to the practise of pharmacy and the prevention of adulteration in drugs and medicines, it is, however, *de facto* the legal standard for the entire United States as much as though its authority had been declared by congressional fiat. No especial attempt has so far been made to legalize the Pharmacopœia through the Congress of the United States, but since the National Government is represented in its creation and accepts its standard quite as readily as do the States and local governments there may be no need for the Federal insignia, at least not until a National Department of Health be created.

The United States Pharmacopœia may be defined as an authoritative compilation or work (1) creating standards for the identification, purity, strength, and quality, and (2) giving directions for the purification, valuation, preparation, compounding and preservation of drugs, chemicals, and medicinal substances.

The French Pharmacopœia is denominated the *Codex Medicamentarius*. This last title expresses the scope and functions of a pharmacopœia better than any other. It should be a pharmacal code for physicians and pharmacists. With thoroughly educated and experienced pharmacists, the physician is assured not only of uniformity in product, strength, purity, and quality, but also that such medicines shall be prepared according to the best and most advanced methods of the pharmacal art.

While the United States Pharmacopœia from a scientific standpoint is undeniably in advance of all other pharmacopœias, yet it lacks certain features to render it more serviceable and consequently more generally acceptable to the medical practitioner. The first of these deficiencies is in the pharmaceutic preparations, particularly

in such classes as are of solid form and also such as are intended for external use. Another deficiency is that the revised edition does not with sufficient accuracy contain as many new substances as have fairly proved their efficacy, promise and utility as therapeutic agents as it should. Thirdly, it lacks certain general information which should be incorporated as an authoritative guide to the more intelligent use and application of various remedies. In this last category should be included the maximum dose of all toxic and potent substances and their preparations. While pharmacology (or the science devoted to the action of drugs) and therapeutics (or the science devoted to the indications for and selection of remedies) are not within the scope or function of a pharmacopœia, still the certain safe and accurate method of exhibition and administration of remedies cannot be realized unless their respective forms be based upon these fundamental considerations. It is not otherwise possible to realize the motto of Asclepiades, "*cito, tuto, jucunde.*"

Whatever improvement be necessary in the new pharmacopœia in the direction of its greater therapeutic utility must come from medical men. There may be superfluity of remedial substances in a pharmacopœia, while no authoritative forms for their administration are given. On the other hand the preparations, though made after elaborate processes, may be so defective as to impair their therapeutic usefulness. This is particularly true of solid preparations, especially those intended for external use. While nearly one-half of the 1000 articles of the United States Pharmacopœia are such preparations, these comprise but thirty-three classes, and of these only eleven are solids, six for internal and five for external use.

The French Pharmacopœia has sixty-four classes, in which there are thirty-four solids, eighteen for internal and sixteen for external use. The British Pharmacopœia has thirty-five classes, including thirteen solids, four for internal and nine for external use. It is particularly strong in ointments, having forty-four, and is the only pharmacopœia in which an attempt has been made to discriminate as to the selection of the vehicle employed for ointments of various use. The German Pharmacopœia has forty-five classes with twenty-two general formulæ giving directions for compounding any number of as many different classes of preparations. There are twenty-three classes of solids, about equally divided into preparations for external and internal use.

While a compilation of about five hundred formulæ for preparations of a polypharmaceutical or ephemeral character was published by the American Pharmaceutical Association in 1887, and revised in 1895 under the title of The National Formulary, this work does no

carry authority as a standard like the Pharmacopœia. The National Formulary has been exceedingly useful in introducing greater uniformity into such preparations as elixirs, syrups, pills, etc., but its utility is hampered through the difficulty of acquainting physicians with a semi-official work. Familiarity with and adherence to accepted standards are more likely to be secured through one comprehensive work of official character than through several. The following tables will illustrate (choosing the ointments for this purpose) the differences between the pharmacopœias of leading nations other than the United States:

OINTMENTS OF THE BRITISH PHARMACOPŒIA.

Lard, prepared; Lard, benzoated, 2 per cent. benzoin; Paraffin, hard, melts at 43°-62° C.; Paraffin, soft, melts at 35°-40.5° C.

UNGUENTUM.	Parts active agent.	VEHICLE.	Percentage of strength.
Acid borici.....	1	Soft paraffin 4, hard paraffin 2...	14
Acidi carbolici.....	1	Soft paraffin 12, hard paraffin 6...	5
Acidi salicylici.....	1	Soft paraffin 18, hard paraffin 9...	3 5
Aconitinæ.....	1	Alcohol 3.5, benz. lard 55.....	1.6
Antimonii tartarati.....	1	Simple ointment 4.....	20
Atropinæ.....	1	Alcohol 3.5, benz. lard 55.....	1.6
Belladonnæ ext. alc.....	1	Benz. lard 9.....	10
Calaminæ.....	1	Benz. lard 5.....	18
Cantharidis.....	1	Yellow wax 1, olive oil 6.....	12 5
Cetacei.....	10	Benzoin 1, white wax 4, oil almonds 40.....	18
Chrysarobini.....	1	Benz. lard 24.....	4
Creasoti.....	1	Simple ointment 8.....	11
Elemi.....	1	Simple ointment 4.....	20
Eucalypti.....oil	1	Soft paraffin 2, hard paraffin 2...	20
Gallæ.....	1	Benz. lard 5.....	18
Gallæ cum opii.....	1	Ointment of galls 13.6.....	7
Glycerini Pib. subacet.....	1	Soft paraffin 4, hard paraffin 1½	15
Hydrargyri, Hg.....	16	Suet 1, prepared lard 16.....	45
Hydrargyri ammoniatæ.....	1	Simple ointment 9.....	10
Hydrargyri compositum, ointment mercury.....	6	Yellow wax 3, olive oil 3, camphor 1½.....	40
Hydrargyri iodidi rubri.....	1	Simple ointment 27.3.....	3.5
Hydrargyri nitratis, Hg.....	1	HNO ₃ fl. 3, prepared lard 3¾, olive oil 8 fl.....	10
Hydrargyri nitratis dilutum.....	1	Soft paraffin 2.....	3
Hydrargyri oxidi rubri.....	1	Soft paraffin 5.3, hard paraffin 1.76.....	12
Hydrargyri subchloridi.....	1	Benz. lard 5.47.....	15
Iodi.....Potass. iod. {	7 {	Glycerin fl. 12, prepared lard 19.	{ 15
Iodoformi.....	1	Benz. lard 9.....	{ 15
Picis liquidæ.....	2.5	Yellow wax 1.....	10
Plumbi acetatis.....	2	Benz. lard 73.....	65
Plumbi carbonatis.....	1	Simple ointment 7.....	2.6
Plumbi iodidi.....	1	Simple ointment 7.....	12.5
Potassæ sulphuratæ.....	5	Hard paraffin 18, soft paraffin 55	12.5
Potassii iodidi.....	16	Potass. carb. 1, water 14 fl., benz. lard 110.....	7
Resinæ.....	4	Yellow wax 2, simple ointment 8, oil almonds fl. 1.....	12
Sabinæ, herb.....	4	Yellow wax 1½, benz. lard 8.....	25
Simplex.....	...	White wax 1, benz. lard 1½, oil almonds 1½.....	28
Staphisagriæ.....	1	Benz. lard 2, digest and strain...	...
Sulphuris, subl.....	1	Benz. lard 4.....	33
Sulphuris iodidi.....	5	Hard paraffin 18, soft paraffin 55	20
Terebinthinæ.....oil	8	Resin 1, yellow wax 4, prepared lard 4.....	6
Veratrinæ.....	1	Ol. olive 7, hard paraffin 14, soft paraffin 41.....	50
Zinci oxidi.....	2	Benz. lard 11.....	1.5
Zinci oleati.....	1	Soft paraffin 1.....	20
			50

POMADES OF THE FRENCH CODEX.

POMATUM (POMADE).	Quantity of active agent.	VEHICLE.	Percentage of strength.
Ammoniacaleliquid	20	Suet 10, lard 10.....	50
Antipsoricumsulphur	{ 10	Oil almonds 5, lard 35, water 5.....	16
Potass. carb.	{ 5	Ox marrow 350, oil almonds 100,	
Nervinum.....camphor	{ 15	oil nutmeg 450, oil rosemary,	
Tolu	{ 30	Girofle water 2, lard 24.....	3.3
Belladonna cum extracto ext.....	4	White wax 10, lard 90.....	25
Camphoratum	30	Benz. lard 50.....	18
Carbonate plumbico.....	10	White wax 5, lard 85.....	10
Chloroformo cum	10	Lard 40, olive oil 40.....	7
CitrenumHNO ₃ 8; Hg.	4	Tolu 0.2, rose water 1, calf suet	
Cucumeris de succo cucumeris-	120	60, lard 100.....	...
sative.....			
Epispasticum cum extracto			
Gnidii.....	4	White wax 10, alcohol 9, lard 90.	4
Cantharide luteum de	6	Curcuma 4, oil citron 4, yellow	
		wax 12, lard 84.....	6
Cantharide viride	10	White wax 40, ointment poplar	
		280
Pice	10	Lard 90.....	10
Iodureto plumbico	10	Lard, benz., 90.....	10
Iodureto potassico	10	Lard, benz., 80, water 10.....	10
Iodureto potassico iodureto.....	10	Iodin 2, water 10, lard, benz., 80..	10
Laurinumleaves	{ 10	Lard 100.....	...
berries	{ 10		
Hydrargyro	50	Lard 50.....	50
Hydrargyro simplex.....	10	Lard, benz., 30, of Hg	12.5
Oxydo and hydrargyrico.....	1	Vaselin 15	6 3
Populeum.....poplar buds	80	{ Poppy, belladonna, hyoscya-	
Regent de	{ 1	mus, dulcamara 50, lard 400 ..	
Lead acet.	{ 1	Camphor 0.1, vaselin 18.....	{ 5
Sulfuratum	10	Oil almond 10, benz. lard 80	10
Stibiatumant. et pot. tart.	10	Benz. lard 30	25

OINTMENTS OF THE GERMAN PHARMACOPŒIA.

UNGUENTUM.	Quantity of active agent.	VEHICLE.	Percentage of strength.
Acid borici.....	1	Petrolatum 9.....	10
Basilicum	Turpt. 2; wax, resin, suet, each	
		3; olive oil 9.....	...
Cantharidum.....	1	Oil cantharid 3, wax 2.....	20
Cantharidum veterinari.....	{ 2	Turpt. 2, wax 1, olive oil 4.....	{ 20
Euphorbium	{ 1		{ 10
Cereumwax	3	Olive oil 7.....	30
Cerussæ	3	Petrolatum 7	30
Cerussæ camphorata	5	Ung. cerussæ 95	5
Diachylon	1	Olive oil 1	50
Glycerini	10	Water 15, trag. 2, alcohol 5, glyc-	
		erin 100
Hydrargyri album.....	1	Petrolatum 9.....	...
Hydrargyri cinereum, Hg.....	10	Lard 13, suet 7.....	33
Hydrargyri rubrum.....	1	Petrolatum 9.....	10
Potassii iodidi.....	10	Aq. 7.5, sod. thiosulf. 2.12, lard 82.	10
Leniens (cold cream).....	...	{ White wax 4, spermacet. 5,	
		water 16, oil almonds 32.....	...
Paraffin	1	Paraffin oil 4.....	...
Plumbi, liq. pb.....	10	Evaporate to 50, petrolatum 90 ..	10
Plumbi tannici.....ac. tan.	{ 1	Lard 17
Liq. pb. subacet.	{ 2		
Rosmarinioil	{ 1	Oil nutmeg exp., yellow wax,	...
Juniper.....oil	{ 1	each 2; suet 8, lard 16.....	...
Tartari stibiæ	2	Petrolatum 8	10
Terebinthinæ.....oil	1	Wax 1, turpentine 1.....	10
Zinci, oxide, imp.....	1	Lard 9.....	10

OINTMENTS OF THE JAPANESE PHARMACOPŒIA.


UNGUENTUM.	Quantity of active agent.	VEHICLE.	Percentage of strength.
Glycerini.....starch	1	Water 1, glycerin 9.....	90
Hebræ diachylon.....	1	Oil lini 1.....	50
Hydrargyri album.....	1	Vaselin 9.....	10
Hydrargyri cinereum.....	30	Lard 18, beef suet 42.....	33
Hydrargyri flavum.....	1	Vaselin 9.....	10
Hydrargyri rubrum.....	1	Vaselin 9.....	10
Scopolia.....ext.	1	Lard 9.....	10
Simplex.....	...	Yellow wax 1, oil sesami 2.....	...
Stibiatum.....tart. ant. et pot.	2	Vaselin 8.....	20
Sulfuratum, sublimed.....	1	Lard 2.....	33
Vesicans fort.....canthar.	10	Olive oil 90, wax 70, terebinth 30..	5
Vesicans mitius.....	2.5
Zinci.....oxide	1	Lard 9.....	10

From these observations the following suggestions are offered for the work of the revision in these respective special departments of medicine:

Diseases of the Eye.—Identification and determination of comparative value of the mydriatic alkaloids, with special reference to those of the solanaceous plants and their derivatives. Formulas for collyria, especially solvents. Investigation of the employment of the lamellæ (gelatin disks), containing alkaloids for solution in the eye, instead of water solutions. List of ointments used and character of vehicle employed, with reference to the preference of the paraffins to the more absorbable animal and vegetable fats.

Diseases of the Ear, Nose, and Throat.—Report on antiseptics, anesthetics, anodynes, absorbents, astringents, demulcents, emollients and protectives used in substance or in the following forms, with special reference to solvent or vehicle used: Gargles, insufflations, injections, lotions, oleates, pastilles, tablets, troches, vapors, cereoli (antrophore), pastes, electuary, confections, sprays, oils, medicated stylus, suppositories, cigarettes, papers (fumigating), inhalants, ointments, cerates, plasters.

Skin and Genito-Urinary Diseases.—Report on antiseptics, astringents, absorbents, anesthetics, anodynes, caustics, hemostatics, parasiticides, protectives, rubefacients, styptics, and vesicants used in substance or in the following forms, with special reference to solvent or vehicle. Comparative study of vehicles as to ratio of absorption and classification of ointments, cerates, suppositories, plasters and unctuous preparations for external use: Baths, cataplasms, caustics, crayons, sponges (prepared), fomentations, oils (medicated), enemas, lotions, powders, soaps, solutions, injections, suppositories, cotton, gauze, pomades, ointments, cereoli (antrophore, stylus), cerates, plasters, plaster mulls.



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HAROLD N. MOYER, M.D., EDITOR.

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